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Intra-atrial course of the right coronary artery: a previously missed anomaly

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A 77-year-old woman with recurrent episodes of atypical chest pain was referred to computed tomography (CT) coronary angiography to rule out coronary artery disease. Her history was remarkable with regard to the risk factors arterial hypertension, hyperlipidaemia, and a positive family history for cardiovascular disease. Contrast-enhanced, retrospectively electrocardiography-gated dual-source CT coronary angiography (Siemens Medical Solutions) demonstrated no significant coronary stenoses with normal anatomy of the left main, left anterior descending, and left circumflex artery, whereas the right coronary artery showed an anomalous course. Although origin and proximal segment of the right coronary artery was normal with an epicardial course from the right coronary sinus along the anterior atrio-ventricular groove (Panel A), it passed through the anterior right atrial wall proximal to the acute angle (Panel B) and entered the cavity of the right atrium (Panel C). It then followed a completely intra-cavitary course over ~5.5 cm in length (Panel D). The distal right coronary artery then re-emerged into the epicardium proximal to the crux (Panels E and F).

Cardiac CT represents a cross-sectional imaging modality that allows the simultaneous depiction of coronary arteries, surrounding tissue, and cardiac chambers. The intra-cavitary course of a coronary artery is very rare and has been previously encountered only accidentally at coronary bypass surgery or autopsy. Owing to the purely luminographic nature of conventional coronary angiography, it is highly likely that such a vessel course has been previously missed and that the growing clinical use of cardiac CT may increasingly uncover this rare anomaly.

Panel A. Dual-source CT coronary angiography (cross-sectional image) demonstrating the normal epicardial course of the proximal right coronary artery within the anterior atrioventricular groove (arrow).

Panel B. Dual-source CT coronary angiography (cross-sectional image) illustrating the entrance of the right coronary artery through the anterior right atrial wall (white arrowhead).

Panel C. Dual-source CT coronary angiography (cross-sectional image) showing the intra-atrial course of the right coronary artery (black arrowheads).

Panel D. Dual-source CT coronary angiography (cross-sectional image) demonstrating the distal intra-cavitary course (black arrowheads) of the artery until exiting the right atrium (white arrowhead).

Panel E. Dual-source CT coronary angiography (maximum intensity projection along the right coronary artery) demonstrating the normal proximal segment (arrow), the intra-atrial course (black arrowheads), and the distal epicardial portion of the artery eventually reaching the crux (asterisk).

Panel F. Dual-source CT coronary angiography 3D image (volume rendering technique) showing the entry and exit (white arrowheads) of the right coronary artery. Note the origin of the acute marginal branch immediately proximal to the entry.

